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PATENT APPLICATION
Docket: 14321.79

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:)
Tsutomu Kitoh et al.)
Serial No.: 10/540,789) Art Unit
Filed: April 14, 2005) 2874
Confirmation No.: 2077)
For: ARRAYED WAVEGUIDE GRATING TYPE)
OPTICAL MULTIPLEXER/DEMULTIPLEXER)
CIRCUIT (AMENDED))

TRANSMITTAL FOR INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Transmitted herewith for filing and pursuant to 37 C.F.R. § 1.97 is an Information Disclosure Statement, which includes the following statements, if any, required variously by 37 C.F.R. § 1.98:

- Statement of relevance of selected cited references not in the English language which are not translated.
- Statement that selected cited references are substantially cumulative of an enclosed or previously submitted reference.
- Statement that selected cited references were previously cited by or submitted to the United States Patent and Trademark Office in a prior application which is relied upon for an earlier filing date under 35 U.S.C. § 120.

A. Additional Materials Required Due to Content of Information Disclosure Statement

Transmitted are the following documents in addition to the Information Disclosure Statement as required variously under 37 C.F.R. § 1.98:

- ☒ Form PTO-1449 listing 21 references submitted for consideration.
- ☒ A copy of 13 Non-US references listed on the Form PTO-1449.
- ☐ English translations of ____ (____) of the references listed on the Form PTO-1449 which are not in the English language.
- ☐ Copies of the following documents from the prosecution of a previous, related application:
 - ☐ Form PTO-1449 AND INFORMATION DISCLOSURE STATEMENT; and
 - ☐ Form PTO-892

B. Additional Materials Required Due to Timing of Filing of Information Disclosure Statement

The transmitted Information Disclosure Statement is being filed within one (1) of the following four (4) time periods:

- I. ☒ Prior to the later of either three (3) months following the filing date or the mailing of a first Office Action. Accordingly, no materials other than those listed above are enclosed.
- II. ☐ Following the latter of either three (3) months following the filing date or the mailing of a first Office Action, but before the mailing of a final Office Action or a Notice of Allowance. Accordingly, to secure consideration thereof, one (1) of the following is also enclosed:
 - ☐ Promptness Certification; or
 - ☐ Check No. _____ in the amount of ____ constituting the submission fee set forth in 37 C.F.R. § 1.17(p).
- III. ☐ After the mailing of a Notice of Allowance, but before payment of the Issue Fee. Accordingly, in order to secure consideration thereof, each of the following are also enclosed:
 - ☐ Promptness Certificate;
 - ☐ Petition for Consideration; and

- ___ Check No. in the amount of ___ constituting the petition fee set forth in 37 C.F.R. § 1.17(i)(1).
- IV. ___ After payment of the Issue Fee. Accordingly, in order to secure consideration thereof, each of the following are also enclosed:
- ___ Petition to Withdraw from Issue; and
- ___ Check No. ___ in the amount of ___ constituting the petition fee set forth in 37 C.F.R. § 1.17(i)(1).

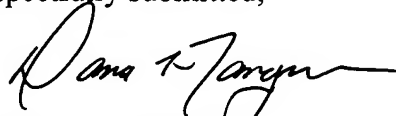
C. Fees

The Commissioner is hereby authorized to charge payment of or any deficiency in the following fees associated with this communication, or to credit any overpayment thereof, to Deposit Account No. 23-3178. A duplicate copy of this letter is enclosed.

- X Any fee required in relation to filing of this letter or any documents transmitted therewith.
- ___ The submission fee set forth in 37 C.F.R. § 1.17(p) in the event that 37 C.F.R. § 1.97(c) applies and the Examiner is not satisfied that any Promptness Certificate submitted meets the requirements of 37 C.F.R. § 1.97(e).
- ___ The submission fee set forth in 37 C.F.R. § 1.17(p).
- ___ The petition fee set forth in 37 C.F.R. § 1.17(i)(1).

Dated this 31st day of August 2006.

Respectfully submitted,



DANA L. TANGREN
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Registration No. 37,246
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Telephone No. 801.533.9800



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PATENT APPLICATION

Docket: 14321.79

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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For: ARRAYED WAVEGUIDE GRATING TYPE)
OPTICAL MULTIPLEXER/DEMULTIPLEXER)
CIRCUIT (AMENDED))

CERTIFICATE OF DEPOSIT UNDER 37 C.F.R. § 1.8

I hereby certify that the following documents are being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to: Commissioner for Patents, PO Box 1450, Alexandria, Virginia 22313-1450, on the 31st day of August 2006.

- Transmittal for Information Disclosure Statement (3 pages)
- Information Disclosure Statement (4 pages)
- Form PTO-1449 listing 21 references (2 pages)
- A copy of 13 Non-US of the references listed on the Form PTO-1449
- Postcard

Respectfully submitted,

DANA L. TANGREN
Attorney for Applicant
Registration No. 37,246
Customer No. 022913
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PATENT APPLICATION
Docket: 14321.79

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OPTICAL MULTIPLEXER/DEMULTIPLEXER)
CIRCUIT (AMENDED))

INFORMATION DISCLOSURE STATEMENT
UNDER 37 C.F.R. § 1.97

Commissioner for Patents
PO Box 1450
Alexandria, Virginia 22313-1450

Sir:

Please find, pursuant to 37 C.F.R. § 1.98(a)(1), the enclosed Form PTO-1449 which contains a list of all patents, publications, or other items that have come to the attention of one or more of the individuals designated in 37 C.F.R. § 1.56(c). While no representation is made that these references may be "prior art" within the meaning of that term under 35 U.S.C. §§ 102 or 103, the enclosed listed references are disclosed so as to fully comply with the duty of disclosure set forth in 37 C.F.R. § 1.56.

Moreover, while no representation is made that a specific search of office files or patent office records has been conducted or that no better art exists, the undersigned attorney of record believes that the enclosed art is the closest to the claimed invention (taken in its entirety) of which the undersigned is presently aware, and no art which is closer to the claimed invention (taken in its entirety) has been knowingly withheld.

In accordance with 37 C.F.R. §§ 1.97 and 1.98, a copy of each of the listed references or relevant portion thereof that is not a US patent document is also enclosed.

Statement of Relevance of References Listed
Unaccompanied by English Translation
Under 37 CFR § 1.98(a)(3)

In accordance with 37 CFR § 1.98(a)(3), the following concise explanation of the relevance of each listed reference that is not in the English language and unaccompanied by a translation into English is provided.

European Application No. EP 0 783 118: The input waveguide (Ge) comprises a guide layer of size and refractive index giving a lateral confinement factor of at least 95%. It enters a diffraction space (Ce) which is a star coupler connected by a grating formed with guides (gi) of different wavelengths to a second star coupler (Cs). A focusing surface (Zf) is bounded by the second coupler and receives waves as a function of their wavelength. The receiving surface (Ze) together with the input guide is made with dimensions such that the diffracted wave of a given input is formed on the surface such that its amplitude as a function of position has a part at least of several secondary lobes.

French Application No. FR 2 779 298: A typical demultiplexer has a narrow inlet channel formed on a substrate, carrying a mixture of electromagnetic wave of different wavelengths (λ_1 - λ_9). The waves enter a first broad area (6) and spread out from a mode conversion point (8). The wave fronts form an arc of a circle (B-B') which enters a diffraction region (4) with a large number of narrow waveguide channels (5) of different lengths. The exit ends of the channels form a similar arc of a circle (C-C'), debouching onto a second broad area (7), and different wavelengths are diffracted in different directions and are focused onto different points on a curved focal plane (11). A number of different outlet channels may be provided, one for each wavelength. The wavelengths used lie within the visible optical spectrum.

Japanese Application No. JP 7-333447: PURPOSE: To realize an optical equalizer which compensates dispersion of optical fibers and the array waveguide diffraction gratings having flat optical frequency characteristics with each of respective channels by specifying the parameters of array waveguide diffraction gratings. CONSTITUTION: Signal light of a frequency (f) (wavelength $\lambda = c/f$) is spread by diffraction in the first sectional slab waveguide 22 and is introduced to the channel waveguide array 23 arranged perpendicularly to its diffraction plane when this signal light is made incident on the central part of the channel waveguide 11 for input. At this time, the quantity of the light power to be taken into the respective waveguides of the channel waveguide array 23 depends upon the core opening widths D1 of the respective waveguides. The core opening widths D of the respective waveguides of the channel waveguide array 23 are set at prescribed values at the boundary of the first sectional slab waveguide 22 and the channel waveguide array 23, by which the photoelectric amplitude Bit(n+1) of the (n+1)th (n=0 to N-1) is assigned and the prescribed waveguide length Q(n+1) at about the wavelength λ of below of the light is adjusted.

Japanese Application No. JP 9-297228: PROBLEM TO BE SOLVED: To provide an array waveguide grating having a flat light frequency characteristic. SOLUTION: In the array waveguide grating provided with a channel waveguide 12 for an input arranged on a substrate 11, the channel waveguide 13 for an output, a channel waveguide array 14, a first sector slab waveguide 15 and a second sector slab waveguide 16, cores of respective waveguides of the channel waveguide 12 for the input in the vicinity of the boundary with the first sector slab waveguide 15 are made a parabolic shape. Thus, a light distribution having a flat electric field distribution in the boundary between the second sector slab waveguide 16 and the channel waveguide 13 for the output is formed, and the flat light frequency characteristic nearly fixing a dividing output characteristic even when a wavelength (light frequency) of a light source is changed is realized.

Japanese Application No. JP 11-142661: PROBLEM TO BE SOLVED: To provide a array waveguide type wavelength multiplexer demultiplexer which can stably and easily actualize flat light frequency characteristics. SOLUTION: The light intensity distribution (far field pattern) of a channel waveguide array 13 is approximated to a sinc function type by removing some waveguide which should originally has light intensity of 0 in the channel waveguide array 13, and consequently flat light frequency characteristics are actualized.

Japanese Application No. JP 2002-90561: PROBLEM TO BE SOLVED: To provide an optical multiplexer/demultiplexer having structure by which a manufacture tolerance required for realizing the improvement of a transmission wavelength characteristics is relaxed. SOLUTION: A free propagation region (160) for improving the transmission wavelength characteristic is provided between an input waveguide (110) and a first slab waveguide (120). The free propagation region (160) is provided with a first part (161) whose width is increased from the input waveguide (110) toward the first slab waveguide (120) and a second part (162) which has the width larger than that of the input waveguide (110), the distribution of electric field intensity of light which advances from the input waveguide (110) to the first slab waveguide (120) is widened once by the first part (161), but the widening is inversely limited by the second part (162). Thus, the change of the distribution of electric field intensity is less liable to the change of a waveguide width, and consequently required precision for fine working is relaxed.

Japanese Application No. JP 2002-311264: PROBLEM TO BE SOLVED: To provide an array waveguide grating, an array waveguide grating module, an optical communication apparatus and an optical communication system, by which a degree of freedom in optical frequency characteristics can be increased and the transmission light having flat characteristics can be obtained. SOLUTION: First channel waveguides 1021 -1023 of the array waveguide grating are connected with a first fan-shaped slab waveguide 105 through first - third exponential optical waveguides 1111 -1113. In a second boundary part 109 located symmetrically with a first boundary part 108 through a channel waveguide array 104, second channel waveguides 1031 -1033 are connected through first - third tapered optical waveguides 1121 -1123 to a second fan-shaped slab waveguide 106, for example. By partially adopting the exponential optical waveguides 111 at least, optical frequency characteristics can be improved rather than the shape of a secondary function and the degree of freedom can be improved rather than a rectangular shape.

Dated this 31st day of August 2006.

Respectfully submitted,



DANA L. TANGREN
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Applicant: Tsutomu Kitoh et al.

Confirmation No.: 2077

Serial No.: 10/540,789

Att'y Docket No.: 14321.79

Filing Date: April 14, 2006

Art Unit: 2874


 ARRAYED WAVEGUIDE GRATING TYPE OPTICAL MULTIPLEXER/DEMULTIPLEXER
 CIRCUIT (AMENDED)

INFORMATION DISCLOSURE CITATIONS MADE BY APPLICANT

U.S. Patent Documents

<u>Examiner Initial*</u>	<u>Document Number</u>	<u>Issue Date</u>	<u>Name</u>
____ 1	5,136,671	08/04/1992	Dragone
____ 2	5,467,418	11/14/1995	Dragone
____ 3	6,069,990	05/30/2000	Okawa et al.
____ 4	6,222,956 B1	04/24/2001	Akiba et al.
____ 5	6,298,186 B1	10/02/2001	He
____ 6	2002/0001433 A1	01/03/2002	Hosoi
____ 7	2002/0150338 A1	10/17/2002	Hosoi
____ 8	2002/0176665 A1	11/28/2002	Missey et al.

Foreign Patent Documents

<u>Examiner Initial*</u>	<u>Document Number</u>	<u>Publication Date</u>	<u>Country or Patent Office</u>	<u>Translation</u>
____ 9	0 783 118 A1	07/09/1997	EP	No
____ 10	1 333 300 A2	08/06/2003	EP	N/A
____ 11	2 779 298	12/03/1999	France	No
____ 12	7-333447	12/22/1995	Japan	No
____ 13	9-297228	11/18/1997	Japan	No
____ 14	11-142661	05/28/1999	Japan	No
____ 15	2002-90561	03/27/2002	Japan	No
____ 16	2002-311264	10/23/2002	Japan	No

Examiner:

Date Considered:

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609, draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Applicant: Tsutomu Kitoh et al.

Confirmation No.: 2077

Serial No.: 10/540,789

Att'y Docket No.: 14321.79

Filing Date: April 14, 2006

Art Unit: 2874

For: ARRAYED WAVEGUIDE GRATING TYPE OPTICAL MULTIPLEXER/DEMULTIPLEXER
CIRCUIT (AMENDED)Other Documents

(including author, title, pertinent pages, etc.)

Examiner

Initial*

- _____ 17 K. Okamoto and A. Sugita, *Flat Spectral Response Arrayed-Waveguide Grafting Multiplexer with Parabolic Waveguide Horns*, Electronics Letters, Vol. 32, No. 18, August 29, 1996.
- _____ 18 Mikitaka Ito et al., *Design Parameter Dependence of Chromatic Dispersion in Silica-Based AWG*, The Institute of Electronics, Information and Communication Engineers electronics Society Taikai, August 20, 2002, Koen Ronbunshu 1, pp. 161.
- _____ 19 Hiroaki Yamada et al., *Dispersion Resulting from Phase and Amplitude Errors in Arrayed-Waveguide Grating Multiplexers-Demultiplexers*, Optics Letters, Vol. 25, No. 8, April 15, 2000, pp. 569-571.
- _____ 20 Michael E. Marhic, *Calculation of Dispersion in Arrayed Waveguide Grating Demultiplexers by a Shifting-Image Method*, IEEE Journal of Selected Topics in Quantum Electronics, Vol. 8, No. 6, November/December 2002, pp. 1149-1157.
- _____ 21 T. Kitoh et al., *Low Chromatic-dispersion Flat-top Arrayed Waveguide Grating Filter*, Electronics Letters, Vol. 39, No. 15, July 24, 2003, pp. 1116-1118.

References Cited by Applicants

While the filing of Information Disclosure Statements is voluntary, the procedure is governed by the guidelines of Section 609 of the Manual of Patent Examining Procedure and 37 C.F.R. §§ 1.97 and 1.98. To be considered a proper Information Disclosure Statement, Form PTO-1449 shall be accompanied by a copy of each listed patent or publication or other item of information and a translation of the pertinent portions of foreign documents (if an existing translation is readily available to the applicant), an explanation of relevance of each reference not in the English language, and should be submitted in a timely manner as set out in MPEP Sec. 609.

Examiners will consider all citations submitted in conformance with 37 C.F.R. § 1.98 and MPEP Sec. 609 and place their initials adjacent the citations in the spaces provided on this form. Examiners will also initial citations not in conformance with the guidelines which may have been considered. A reference may be considered by the Examiner for any reason whether or not the citation is in full conformance with the guidelines. A line will be drawn through a citation if it is not in conformance with the guidelines AND has not been considered. A copy of the submitted form, as reviewed by the Examiner, will be returned to the applicant with the next communication. The original of the form will be entered into the application file.

Each citation initialed by the Examiner will be printed on the issued patent in the same manner as references cited by the Examiner on Form PTO-892.

The reference designations "A1," "A2," etc. (referring to Applicant's reference 1, Applicant's reference 2, etc.) will be used by the Examiner in the same manner as Examiner's reference designations "A," "B," "C," etc. on Office Action Form PTO-1142.

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Examiner:

Date Considered:

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609, draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.